PURDUE
RESEARCH FOUNDATION

STARTUP CLASS OF 2018

150 YEARS OF GIANTLEAPS™

IDEA TO IMPACT

Class of 2018 Purdue Startups

Purdue University continued to excel with its startup and commercialization activities for the fifth consecutive year with 25 startups based on Purdue intellectual property and another 20 startups based on innovations owned by faculty, staff and students.

Over the past five years, Purdue has generated 223 startups that raised more than $350 million in funding and investments. Nearly 130 of the startups have licensed Purdue University intellectual property through the Purdue Research Foundation Office of Technology Commercialization. The remainder of startups are affiliated with Purdue in some way and/or based on company-owned intellectual property. More than 60 of the company-owned startups are founded and owned by Purdue students who in 2013 were granted the right to own the intellectual property that they generated as students at the university.

"Purdue has a 150-year history of producing world-class research. Five years ago we set out to establish an equally strong commercialization ecosystem to ramp up the translation of this research into the market and into real-world solutions," Purdue University President Mitch Daniels said. "These efforts are clearly beginning to bear fruit, and to encourage us that these gains are just a beginning."

A recent report released by the National Academy of Inventors (NAI) and the Intellectual Property Owners Association (IPO), reported that Purdue is ranked 17th in the world among universities granted U.S. utility patents in 2017.

In this way, Purdue is advancing commercialization, entrepreneurship, job creation and economic momentum in the Midwest with record-breaking activities.

"It's not a single entity, but a movement across campus built upon Purdue's very rich pipeline of cutting-edge technologies and the commitment that the people at Purdue have to serving its land-grant mission," said Greg Deason, senior vice president of entrepreneurship and placemaking. "It is amazing to be part of such a dynamic movement of turning ideas into true global impact."

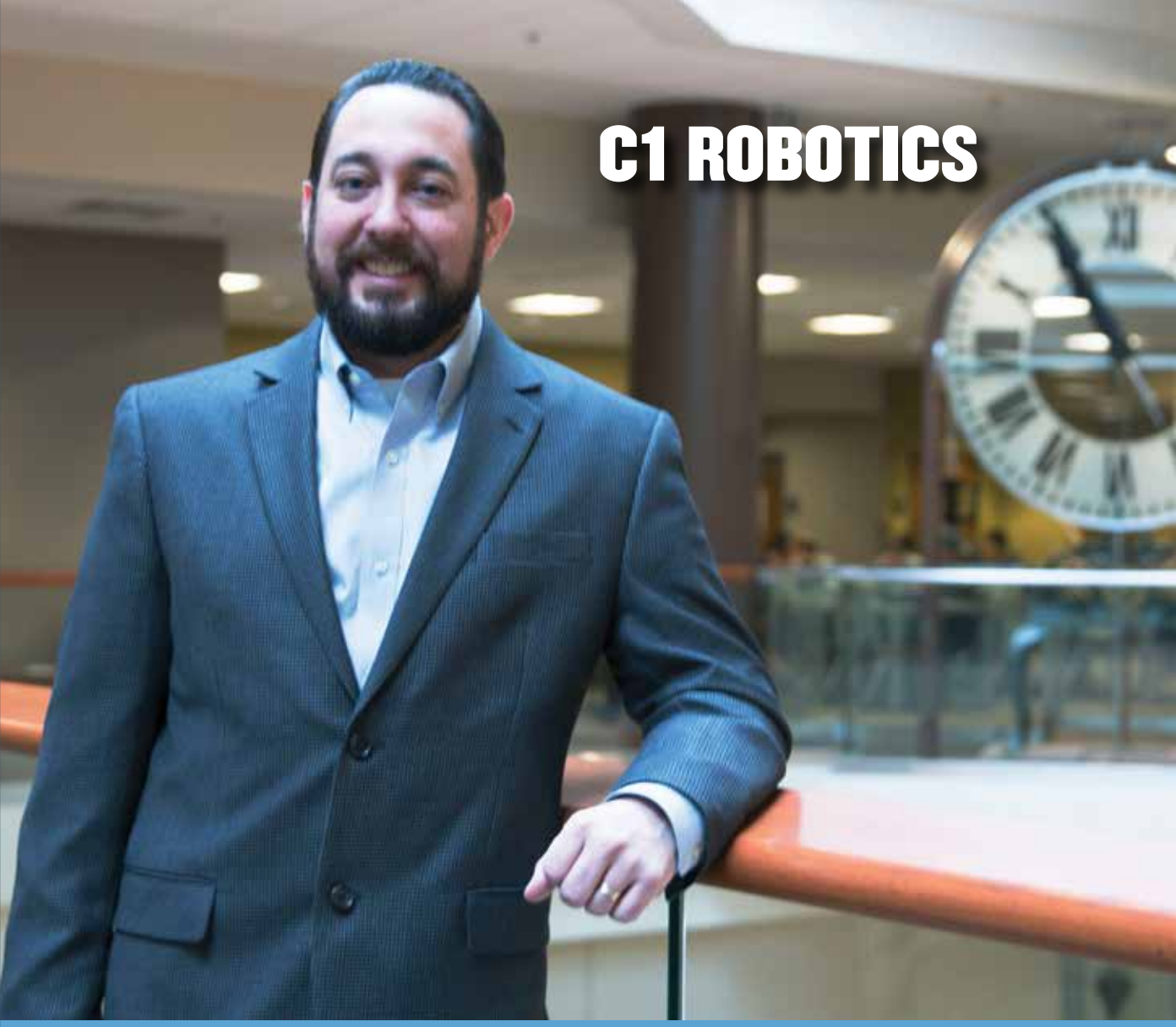
For more information about available leadership positions, investing in a Purdue startup or licensing a Purdue innovation, visit PurdueFoundry.com.

Purdue IP-Licensed Startups

- C1 Robotics LLC
- C2 Medical Robotics Inc.
- CastArmor LLC
- Commit LLC
- Cordian LLC
- GRYFN
- FWDNXT Inc.
- HaptImage LLC
- Hummingbird Robotics
- Hysonic Technologies LLC
- Integrated Modeling Solutions Inc.
- Leaf Spec LLC
- Lecturewise Inc.
- MediTrak Life LLC
- Next Offset Solutions Inc.
- NutraMaize LLC
- Ongenia LLC
- PeopleStat LLC
- Petal Solutions LLC
- Progeny Drone Inc.
- Samara Biotech LLC
- SMK Diagnostics LLC
- Spirrow Therapeutics LLC
- University Pharm LLC
- XYZStream LLC

FY 2018 Purdue Faculty-, Staff- or Student-owned Startups

- 449 Natural LLC
- A2Biomolecules
- Algetec
- Barbell Flair LLC
- Boiler Garden LLC
- Classmate
- ERS Products
- GT Inc.
- HelloNeighbor LLC
- Hyre Me LLC
- Kindi Therapeutics and Drug Discovery
- Level 6 Engineering
- McCombs Sport Performance & Fitness LLC
- PlanBee
- Rad Matters
- Rofori Corporation
- TowerShield LLC
- Trachtenberg Tech LLC
- WhoCan
- XoomDat



C1 ROBOTICS

David J. Cappelleri, an Associate Professor of Mechanical Engineering, is developing innovative robotic technology for health care, government and industrial applications. This includes novel micro aerial vehicles for remote lightweight maintenance and repair tasks and microrobot solutions for in vitro and in vivo biomedical applications.

dcappell@purdue.edu

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C2 MEDICAL ROBOTICS

David J. Cappelleri, an Associate Professor of Mechanical Engineering, is developing low-cost, articulated, disposable, robotic spinal surgical tools and devices for a lumbar discectomy, the most common surgical spinal procedure in the United States with more than 300,000 a year. No robotic tools or systems currently exist for lumbar discectomy procedures.

dcappell@purdue.edu

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Aliasger Zaidy, Abhishek Chaurasia, Eugenio Culurciello and Andre Chang are part of FWDNXT Inc., a startup that is designing next-generation hardware and software for deep learning aimed at enabling computers to understand the world in the same way humans do.

The team at FWDNXT has developed a low-power mobile co-processor called Snowflake for accelerating deep neural networks effective at image recognition and classification. Snowflake was designed with the primary goal of optimizing computational efficiency by processing multiple streams of information to mix deep learning and artificial intelligence techniques with augmented reality application.

Culurciello founded FWDNXT.

www.fwdnxt.com

GRYFN

Led by Mitch Tuinstra, GRYFN was founded by eight professors with backgrounds in Aeronautics, Biology, Plant Sciences, Agricultural and Biological Engineering, Civil Engineering, and Electrical and Computer Engineering.

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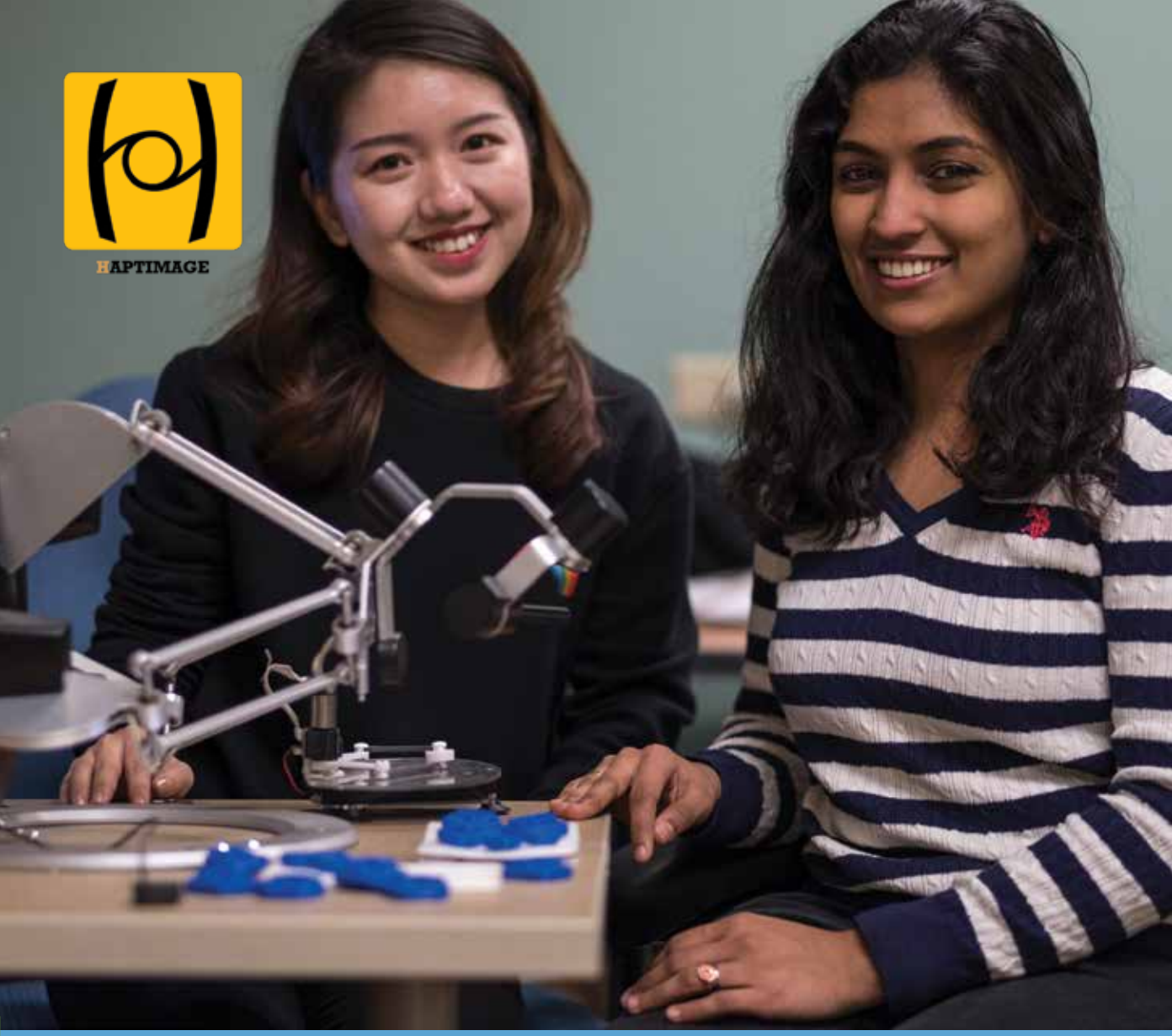
AGRICULTURE

GRYFN is developing advanced remote sensing software for multi-sensor and multi-temporal drone imagery coalignment, processing, and analytics. GRYFN maintains a strategic vertical market focus in high throughput crop phenomics, the process of measuring and analyzing observable plant characteristics.

Tuinstra is also the Wickersham Chair of Excellence in Agricultural Research and Professor of Plant Breeding and Genetics in the Department of Agronomy at Purdue.

Info@GRYFN.io



Ting Zhang and Shruthi Suresh are co-founders of HaptImage LLC, which has created an image accessing system which allows individuals who are visually impaired to use a portable controller with supporting software to explore images in real-time.

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Zhang, a doctoral student in the School of Industrial Engineering, created the system with her co-advisors, Juan Wachs, a professor in the School of Industrial Engineering and Bradley Duerstock, a professor in the School of Industrial Engineering and the Weldon School of Biomedical Engineering. Suresh is a doctoral student in Weldon School of Biomedical Engineering.

www.HaptImage.com

HUMMINGBIRD ROBOTICS

Hummingbird Robotics, founded by associate professor Xinyan Deng of Purdue's School of Mechanical Engineering, is working on bio-inspired robots for new solutions to save lives during natural disasters and help the military better fight enemies.

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Flapping vehicles have advantages over helicopters, planes and drones, including the ability to operate effectively in confined spaces with improved maneuverability. Such an advantage would allow the flapping vehicles to be used in search-and-rescue operations after natural disasters, aerial surveillance for the military and the creation of mobile sensor networks.

xdeng@purdue.edu

HySonic

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HySonic Technologies LLC (HyST) specializes in development of computational models for the simulation of flow problems of interest to the defense industry. Already funded by NASA-Ames to carry out modeling of turbine engine noise control, HyST is engaging customers in the field of prediction of combustion instabilities, hypersonic and supersonic flow, high-speed turbulence and aero-acoustics.

HyST leverages the modeling expertise developed by Assistant Professor of Mechanical Engineering Carlo Scalo's research team at Purdue. HyST is in the process of commercializing Purdue-owned technology generated under such funding and creating new predictive modeling technology of its own tailored to specific customer's needs.

cscalo@purdue.edu

Dan DeLaurentis and Kris Ezra co-founded Integrated Modeling Solutions Inc. which is a modeling and simulation design company. Leveraging more than 25 years of experience, IMS offers a simulation framework for tackling very broad questions in the area of system-of-systems research and also consulting services.

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Their software enables a flexible and extensible problem-solving approach to help researchers explore large spaces of design choices quickly, come up with better metrics to capture the big picture of their problems, and spend more time tackling their driving research questions.

ddelaure@purdue.edu

LEAF SPEC

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Jan Jian, an Assistant Professor in the Department of Agricultural and Biological Engineering, founded Leaf Spec LLC to build an innovative handheld sensor gives plant scientists and farmers a more precise way of measuring the health of crops while gathering up-to-the-minute data that state and federal officials and others will find valuable.

The hyperspectral device scans a plant for physiological features, such as moisture, nutrient and chlorophyll levels, as well as different chemical spraying effects and disease symptoms to determine whether it is healthy or under stress.

The sensor, which can scan a plant in less than five seconds, can detect hundreds of bands of color in each pixel compared with the three bands of color detected by traditional cameras.

jinjian@purdue.edu

MediTrak Life

Humphrey Kanyoke, a Krannert MBA 2018 graduate, founded MediTrak Life to deliver the first end-to-end continuous patient monitoring system linking pre-hospital patient monitoring to patient monitoring in all departments and wards in the hospital.

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KRANNERT
SCHOOL OF MANAGEMENT

The MediTrak system consists of a proprietary, smart, portable, multi-parameter vital signs monitor. The system collects blood pressure, pulse, respiration, oxygen saturation and temperature of a patient. The system will help clinicians make improved care decisions through earlier detection of patient deterioration and increase hospitals' bottom lines through lower patient length of stay.

hkanyoke@yahoo.com

NEXT
OFFSET SOLUTIONS

PURDUE
ENGINEERING

Jeffrey Rhoads, a Professor in Purdue's School of Mechanical Engineering, and Emre Gunduz, a former Research Assistant Professor at the School, along with a few colleagues, have launched a faculty-owned startup called Next Offset Solutions Inc. The startup has devised a method of 3-D printing that can produce energetic materials with fine geometric features faster and with less expense than traditional methods, while also being safer and more environmentally friendly.

Next Offset Solutions makes the printers and the energetic materials, including solid rocket fuels, other propellants and pyrotechnics. The process allows the researchers to safely deposit energetic materials with a high level of precision.

www.nextoffset.com

PURDUE
AGRICULTURE

Torbert Rocheford and his son Evan founded NutraMaize LLC to bring the benefits of his orange corn to American consumers. Torbert Rocheford, the Patterson Endowed Chair in Translational Genomics for Crop Improvement in the Purdue College of Agriculture's Department of Agronomy, developed orange corn as part of an ongoing humanitarian effort called HarvestPlus to improve nutrition in developing countries.

He then used a process known as biofortification to naturally increase the amount of antioxidant carotenoids in corn, making the corn more nutritious. NutraMaize is marketing the corn under the brand name "Professor Torbert's Orange Corn."

nutramaize.com

Andrew Huang, a graduate student in the School of Industrial Engineering, is the Founder of Ongenia LLC, which is developing a bio-material alternative to standard heating, ventilation and air conditioning (HVAC) units' air filters.

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ENGINEERING

Typical HVAC units control heat and air supply as well as ventilation in indoor spaces to achieve the desired room temperature and humidity. The units also include filters of polyester or fiberglass that remove large particles out of the air. Common air pollutants include dust, smoke and dirt, which can affect both indoor and outdoor air quality. Ongenia has developed a novel bio-based filter alternative that addresses issues of sustainability, health and lower expenses that are desired in the HVAC industry.

huang430@purdue.edu

PURDUE
ENGINEERING

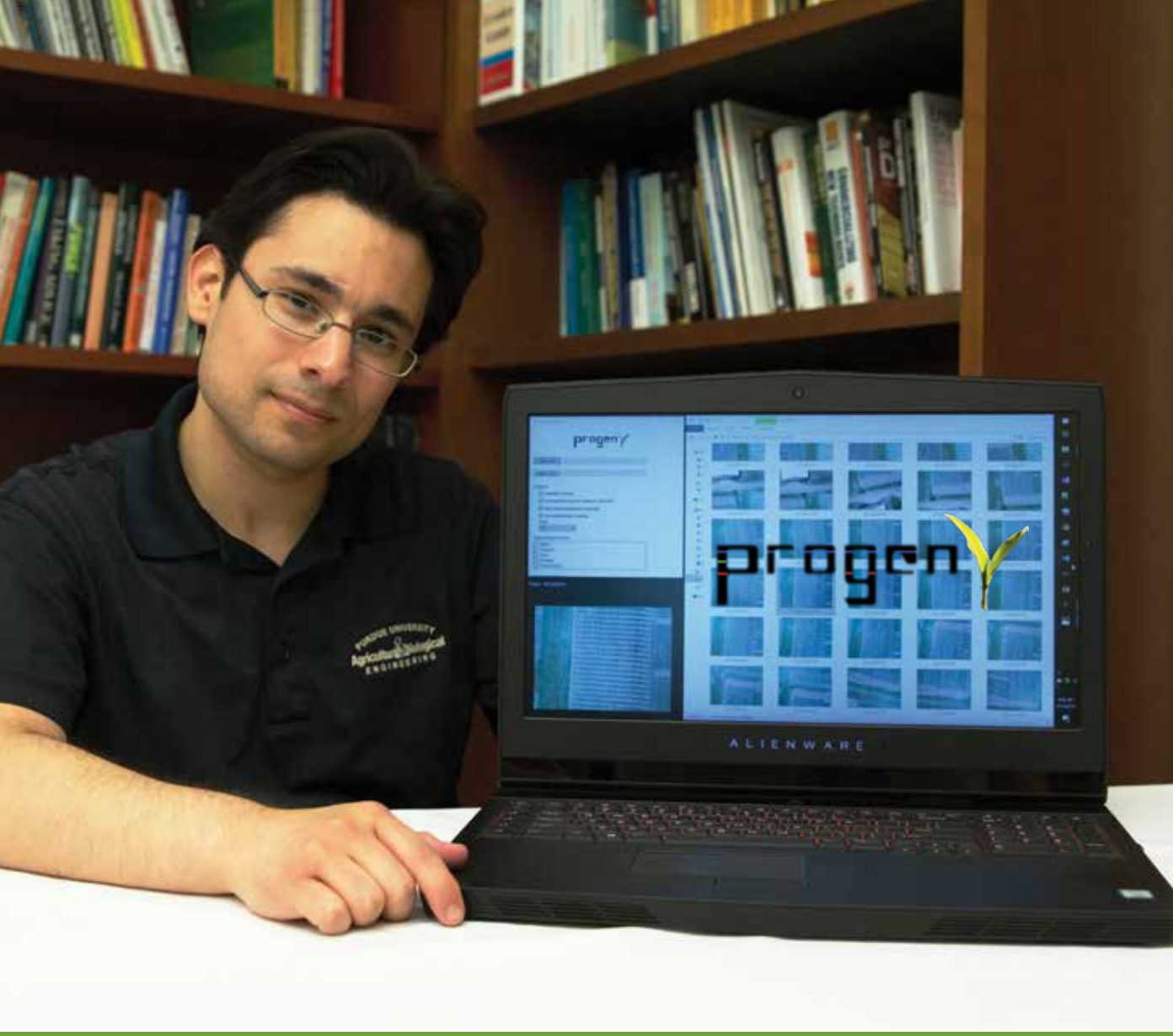
PeopleStat LLC is a startup in West Lafayette, Indiana, that is focused on addressing the epidemic of diabetes in the United States. The company collects and analyzes anonymized data streams coupled with machine learning to provide feedback to people who are either prediabetic or actively diabetic so that they can make appropriate lifestyle changes to better manage their own condition. This is augmented by facilitation of patient-provider communication via direct in-app connectivity. While this vision includes consumption of data from any smart devices, there is an expectation that PeopleStat will, in time, bring their own sensors to market as well.

peoplestat.io

PURDUE
ENGINEERING

Guillermo Paniagua, Valeria Andreoli, David Cuadrado and James Braun founded Petal Solutions LLC, which is developing instruments to precisely measure pressure, temperature and other analytics inside the harsh environments of rocket engines and gas turbines. The researchers, led by Paniagua, a Professor of Mechanical Engineering, decided to design their own instruments to mount in engines to track engine performance because research shows there is a need for such a technology in the market.

www.petal-solutions.com



Anthony Hearst is a Co-founder of Progeny Drone Inc., which has created software that rapidly converts aerial crop photos into useful information for plant breeding, crop modeling and precision agriculture. The company's software rapidly turns images into custom-zoned, quality-controlled growth and development metrics.

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AGRICULTURE

Katy Rainey, an Assistant Professor of Plant Breeding and Genetics in Purdue's Department of Agronomy, also is a co-founder.

www.progenydrone.com

SAMARA BIOTECH

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ENGINEERING

Pushpak Bhandari is the founder of Samara Biotech LLC, has developed an easy-to-use method to inject intravenously microscopic bubbles filled with oxygen intravenously so they can be targeted precisely at wounds or cancerous tumors. The nanobubbles improve cancer therapeutics and help wounds heal faster. The bubbles do not actually do the therapies, but enhance other therapies, such as improving chemotherapeutics or radiation efficacy.

pushpak@purdue.edu

SMK DIAGNOSTICS

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Lia Stanciu, Associate Head and Professor of Materials Engineering at Purdue, is a Co-founder of SMK Diagnostics, which has created biosensor technology to identify and monitor diseases such as Zika. The condition set off a global health crisis in 2015 and 2016, and dengue, which causes about 22,000 deaths a year worldwide, mostly among children. Dengue and Zika are from the same family of virus known as flavivirus.

The company was started by Stanciu, Ernesto Marinero, a Professor of Materials Engineering and Electrical and Computer Engineering at Purdue, and Richard Kuhn, the Trent and Judith Anderson Distinguished Professor of Science at Purdue. Their sensor can differentiate between specific flaviviruses and works in less than an hour.

lstanciu@purdue.edu

You-Yeon Won, Professor of Chemical Engineering at Purdue, Davis Arick and Kyle Kim (not pictured) are Co-founders of Spirrow Therapeutics, which is developing a novel treatment for a life-threatening lung condition known as acute respiratory distress syndrome, or ARDS.

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ENGINEERING

They have developed a treatment that mimics the behavior of the natural surfactant in the lungs to work within the lungs' processes for inflation and oxygenation. The researchers also believe it is immune to the deactivation effect of ARDS and may help until the body begins producing the natural surfactant again and begins using it correctly.

spirrowtherapeutics.com

OTHER 2018 STARTUPS

CASTARMOR

CastArmor LLC is developing an aluminum die casting lubricant to allow manufactures the ability to improve die casting performance and produce parts from aluminum that are currently unmakeable.

COMMIT

COMMIT is a math tutoring software company with a basis in conceptual model-based learning modules.

CORDIAN

Cordian LLC provides medical imaging analysis technology for accurate, accessible and affordable diagnosis, that leads to reduced costs and healthier hearts.

LECTUREWISE

Krannert alumnus Charlie Sloan and electrical and computer engineering alumnus Varun Mavilla are co-founders of LectureWise LLC, which works on technology to improve classroom learning. The startup created a smartphone platform to streamline classroom communication, improve learning and reduce cheating.

UNIVERSITY PHARM

Tonglei Li, Founder of University Pharm LLC, is commercializing manufacturing devices and processes that allow the industry-scale production of drug nanocrystals for parenteral delivery.

Seeking funding, the CEO, and industrial partners and clients for developing nanocrystal-based products of existing and new drug compounds.

XYZSTREAM

Song Zhang and Tyler Bell founded XYZStream to commercialize their Holostream technology, which was developed to produce high-quality 3-D video communication on mobile devices such as smartphones and tablets using existing standard wireless networks. The technology drastically reduces the data size of 3-D video without substantially sacrificing data quality, allowing transmission within the bandwidths provided by existing wireless networks.

PURDUE FOUNDRY

The Purdue Foundry is an entrepreneurship and commercialization accelerator in Discovery Park's Burton D. Morgan Center for Entrepreneurship whose professionals help Purdue innovators create startups. Managed by the Purdue Research Foundation, the Purdue Foundry was co-named a top recipient at the 2016 Innovation and Economic Prosperity Universities Designation and Awards Program by the Association of Public and Land-grant Universities for its work in entrepreneurship. For more information about funding and investment opportunities in startups based on a Purdue innovation, contact the Purdue Foundry at foundry@prf.org.

PURDUE OFFICE OF TECHNOLOGY COMMERCIALIZATION

The Purdue Office of Technology Commercialization operates one of the most comprehensive technology transfer programs among leading research universities in the U.S. Services provided by this office support the economic development initiatives of Purdue University and benefit the university's academic activities. The office is managed by the Purdue Research Foundation, a private, not-for-profit organization that serves Purdue University. For more information on licensing a Purdue innovation, contact the Office of Technology Commercialization at innovation@prf.org

FY 2018 PURDUE FACULTY-, STAFF- OR STUDENT-OWNED STARTUPS

449 NATURAL LLC

(449 Foods) launched an altruistic, vegan coffee brand that plans to use their profits to help Tanzanian coffee growers. Founders Venecia Wilson and Chris Jones hope to help low-income Tanzanian families, who often rely on the nation's coffee bean industry, pay for their health care and education costs.

ALGETEC

ALGETEC USA is the U.S. branch of a successful educational equipment and curriculum company in Brazil. Genisson Coutinho, a Purdue alumnus, founded the startup in order to help universities teach practical, hands-on engineering concepts. **algetec.com.br**

BARBELL FLAIR LLC

Barbell Flair LLC offers fitness enthusiasts a unique addition to their gym with a 2.5 pound, heart-shaped weight plate. Founder Justin Morrissette designed the plate in honor of the late Chantal Richardson, a Lafayette mother who he had met at a cross-fitness workshop and died from a motorcycle crash the following summer.

BOILER GARDEN LLC

Boiler Garden offers an innovative take on food delivery. The West Lafayette community can now enjoy a low-cost, fresh Indian meal delivered to their home for free. **boilergarden.com**

CLASSMATE

Classmate LLC was founded by John Riccione in order to foster collaborative environments on college campuses. The Classmate mobile app allows students to post questions and interact even when not in class. **classmate.community**

HELLONEIGHBOR LLC

HelloNeighbor, a full-service technology platform, helps the 65+ population and their loved ones by matching skilled care providers within their community to help older adults complete their daily essential activities and live their best lives.

KINDI THERAPEUTICS AND DRUG DISCOVERY

kindirx.com

LEVEL 6 ENGINEERING

Level 6 Engineering helps the defense and national security industries to solve challenges. The startup combines innovative research, industry expertise and novel business thinking in order to help its clients. **level6engineering.com**

FY 2018 PURDUE FACULTY-, STAFF- OR STUDENT-OWNED STARTUPS

MCCOMBS SPORT PERFORMANCE & FITNESS LLC

McCombs Sport Performance & Fitness helps fitness enthusiasts receive high-quality personal training across a variety of disciplines. Founder Brandon McCombs offers his fitness and training expertise in order to exceed customers' expectations. **mccombsfitness.com**

PLANBEE

Becky Cranham, a former elementary school teacher, founded PlanBee in 2009 in order help other primary school teachers' maintain a work life balance. The startup designs lesson plans, creative activities and whole lesson plans that teachers can teach from with minimal preparation. **planbee.com**

ROFORI CORPORATION

Rofori Corporation created DEFCON CYBER, a comprehensive cybersecurity solutions for small businesses. This cybersecurity product understands how time-consuming small business management can be and assesses cyber threats constantly in order to ensure maximum cyber protection. **defconcyber.com**

TOWERSHIELD LLC

TowerShield developed the Cube Hog game which is a new type of card game encouraging sleight of hand and memory challenges. Purdue students Tyler Damm and Thibault Corens designed the game to provide a short, but cognitively challenging game for university students. **tower-shield.com**

TRACHTENBERG TECH LLC

Cryptocurrency Mining as a service.

XOOMDAT

XoomDat helps small businesses with their platforms tailored specifically to each clients' needs. The startup offer services in search analytics and business intelligence that assist business accomplish meaningful, real time search designed to improve operations efficiency and financial performance. **xoomdat.com**

A2BIOMOLECULES

ERS PRODUCTS

GROUNDTRUTH INC.

HYRE ME LLC

RAD MATTERS

WHOCAN

LEARN ABOUT ENTREPRENEURSHIP

Certificate in Entrepreneurship and Innovation Program

Offers a series of five courses designed with flexibility in mind, which provides the opportunity for undergraduate students to gain an entrepreneurship certificate that is complementary to all majors. **www.purdue.edu/entr**

The Anvil

Bridges the gap between an idea and a startup, and provides resources for innovators.
anvilstartups.com

Deliberate Innovation for Faculty (DIFF)

DIFF provides mentoring for Purdue innovators who have an interest in translating their inventions to the public through commercialization, collaboration or entrepreneurship.
www.prf.org/otc/resources/innovators/faculty/deliberate-innovation.html

STARTING A COMPANY

Purdue Foundry

Provides support for business plans, prototype development, funding sources, finance opportunities, regulatory requirements and mentoring, and can offer advice on other entrepreneurial activities.
www.purduefoundry.com

Indiana Economic Development Corporation (IEDC)

Oversees programs enacted by the General Assembly including tax credits, workforce training grants and public infrastructure assistance. **iedc.in.gov**

Small Business Development Centers (SBDC)

Provides assistance to small businesses and aspiring entrepreneurs.
www.sba.gov/tools/local-assistance/sbdc

FUND YOUR INNOVATION

Foundry Investment Fund

The $12 million Foundry Investment Fund, a not-for-profit fund, seeks to join with other investors to fund companies that are based on Purdue technology or expertise in the areas of human and animal health as well as plant sciences. This fund provides a match to outside investors' funds, adding critical capital for the transition from the discovery of a promising technology to the founding of a viable life sciences company. Returns on the investments will remain in the fund for future investments.
www.prf.org/otc/resources/funding/foundry-investment-fund.html

Elevate Purdue Foundry Fund

The Elevate Purdue Foundry Fund is operated jointly by the Purdue Foundry and Elevate Ventures and will further expedite the translation of life-changing intellectual property to commercial sectors. Qualifying startups must be Purdue Foundry clients and also must have gone through the startup process.
www.purduefoundry.com/elevate

Trask Innovation Fund (TIF)

Assists faculty with funding to further the commercial potential of technologies disclosed to the Office of Technology Commercialization (OTC).
www.prf.org/otc/trask/index.html

Purdue Startup Fund

The Purdue Startup Fund was launched to maximize Purdue's commitment to serve others through the commercialization of innovations. As part of this initiative, a $5 million matching program will provide a 1:1 match for gifts to this fund, resulting in more than $10 million to expedite and generate even more commercialization and startup creation.
www.prf.org/otc/documents/2015_udo_brochure.pdf

Ag-celerator

The Ag-celerator is an innovation fund designed to provide critical startup support for Purdue innovators who wish to commercialize patented intellectual property technologies in plant sciences, including areas of research in crop optimization, hybrid and seed development, and precision agriculture.
ag.purdue.edu/plantsciences/ag-celerator-fund/

Elevate Ventures Inc.

Nurtures and develops emerging and existing high-potential businesses into high-performing, Indiana-based companies. **www.elevateventures.com**

FIND INTERESTING TECHNOLOGIES

Purdue Office of Technology Commercialization (OTC)

Operates one of the most comprehensive technology transfer programs among leading research universities in the United States. **www.prf.org/otc/technologies/index.html**

For More Information

Visit these Web sites for more information about the Purdue Research Foundation, the Office of Technology Commercialization, the Purdue Foundry and the Innovation and Entrepreneurship page:

» prf.org
» prf.org/otc
» purduefoundry.com
» prf.org/innovation-and-entrepreneurship

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